

Unit 15

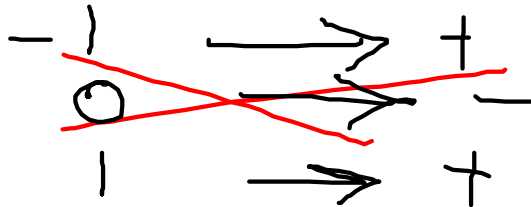
Day 6

DeCartes Rule of Signs

$$\textcircled{26} \quad (x + \frac{2}{5})(15x^2 + 55x - 20)$$

$$(5x+2)(3x^2+11x-4)$$

$$(5x+2)(3x-1)(x+4)$$



<div style="border: 1px solid red; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin-bottom: 10px;">25</div> <div style="display: flex; align-items: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); margin-right: 5px;"> -1 1 0 -1 </div> <div style="border-left: 1px solid red; padding-left: 10px;"> <div style="display: flex; justify-content: space-between; padding: 5px 0;"> 6 17 -3 1 -12 </div> <div style="display: flex; justify-content: space-between; padding: 5px 0;"> 6 11 -42 30 </div> <div style="display: flex; justify-content: space-between; padding: 5px 0;"> 6 23 -8 -20 </div> <div style="display: flex; justify-content: space-between; padding: 5px 0;"> 6 15 -36 0 </div> </div> </div>	$f(x) = (x + \frac{1}{3})(6x^2 + 15x - 36)$ $f(x) = (3x + 1)(2x^2 + 5x - 12)$ $f(x) = (3x + 1)(2x - 3)(x + 4)$ $x = -\frac{1}{3} \quad x = \frac{3}{2} \quad x = -4$
--	---

Descartes' Rule of signs:

Let $f(x)$ be a polynomial with real coefficients and terms in descending degree order:

a) the number of positive real zeros of $f(x)$ either is equal to the number of variations in signs occurring in the coefficients of $f(x)$, or else is less than the number of variations decreased by a positive even integer.

b) the number of negative real zeros of $f(x)$ either is equal to the number of variations in signs occurring in the coefficients of $f(-x)$, or else is less than the number of variations decreased by a positive even integer.

Ex1: $f(x) = -x^4 - 3x^3 + 2x + 7$

of positive real zeros 2, 0

of negative real zeros 2, 0

of complex zeros 0, 2, 4

$$f(x) = (-x)^4 - 3(-x)^3 + 2(-x) + 7$$

$$f(x) = +x^4 + 3x^3 - 2x + 7$$

Ex2: $f(x) = 2x^3 + 6x^2 + 5x - 2$

of positive real zeros 1

of negative real zeros 2, 0

of complex zeros 0, 2

$$f(x) = 2(-x)^3 + 6(-x)^2 + 5(-x) - 2$$

$$= -2x^3 + 6x^2 - 5x - 2$$

Wksht 1-8 all & pg 301 67-72 all